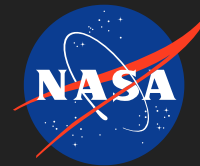


Novel Solid State Lasers for Space-Based Water Vapor DIAL, Phase I

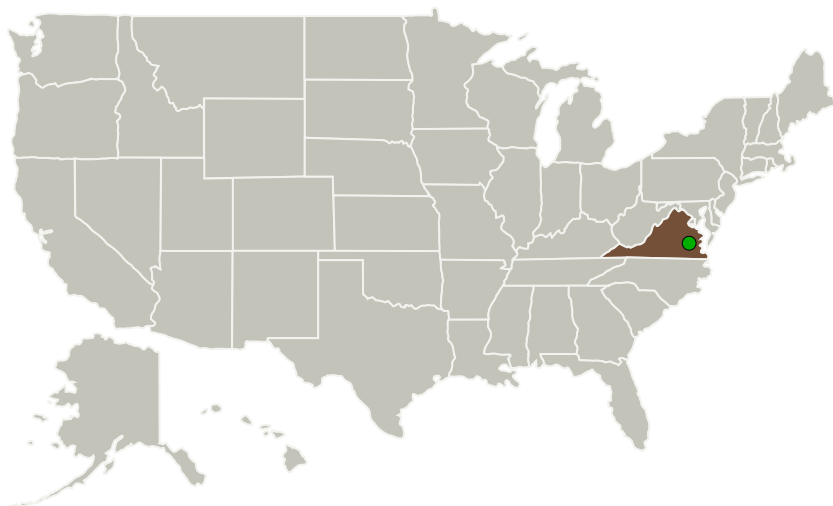


Completed Technology Project (2015 - 2015)

Project Introduction

Fibertek, Inc. proposes to develop a novel laser source designed to meet the needs of planned space-based atmospheric water-vapor (WV) differential absorption lidar (DIAL) instruments. Our approach is based on frequency doubling the output wavelength of efficient near-infrared (NIR) solid-state laser materials doped with rare earth ions that can be efficiently pumped by high-brightness semiconductor laser diodes. In our Phase I program we will also demonstrate a novel resonator, designed to reduce the pulse width and increase the extraction efficiency on low-gain, three-level laser transitions. Our proposed innovation has the potential for improving the operating efficiency of water-vapor DIAL laser transmitters by about a factor of two compared to current lasers.

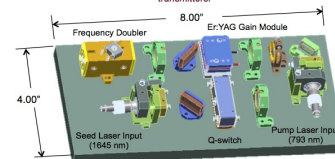
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Fibertek, Inc.	Lead Organization	Industry	Herndon, Virginia
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Concept Design for Braseboard DIAL Transmitter Based on Frequency Doubled Er:YAG

The laser is compatible with packaging in a 1.5 liter housing similar to the ALHAT laser with performance comparable to much larger state-of-the-art water-vapor DIAL transmitters.



Novel Solid State Lasers for Space-Based Water Vapor DIAL, Phase I

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

Novel Solid State Lasers for Space-Based Water Vapor DIAL, Phase I



Completed Technology Project (2015 - 2015)

Primary U.S. Work Locations

Virginia

Project Transitions

June 2015: Project Start

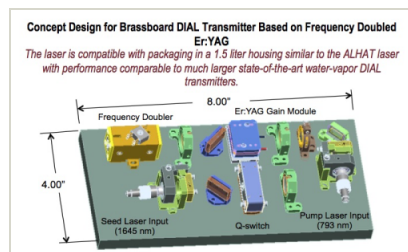
December 2015: Closed out

Closeout Summary: Novel Solid State Lasers for Space-Based Water Vapor DIAL, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/139189>)

Images



Briefing Chart Image

Novel Solid State Lasers for Space-Based Water Vapor DIAL, Phase I
(<https://techport.nasa.gov/image/127924>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Fibertek, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

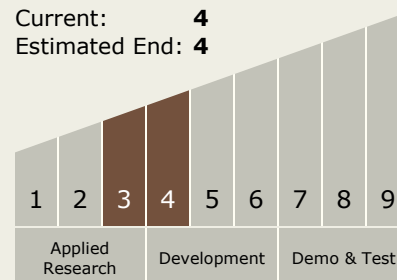
Carlos Torrez

Principal Investigator:

Brian Mathason

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Novel Solid State Lasers for Space-Based Water Vapor DIAL, Phase I

Completed Technology Project (2015 - 2015)



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.3 In-Situ Instruments and Sensors
 - └ TX08.3.1 Field and Particle Detectors

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System